

Kamcap supercapacitor product specification

This product specification specifies the product's performance and test methods as a basis for technical validation.

Product application range

Backup power: RAM, detonator, car recorder, smart meter, vacuum switch, digital camera, motor drive

Energy storage: intelligent three meters, UPS, security equipment, communication equipment, flashlights, water meters, gas meters, taillights, small appliances.

High current operation: electrified railway, smart grid control, hybrid vehicle, wireless transmission.

High-power support: wind power, locomotive start, ignition, electric cars, etc.

Standard test conditions

The standard test conditions of this specification are standard atmospheric pressure, temperature 25 ° C, relative humidity less than 60%.

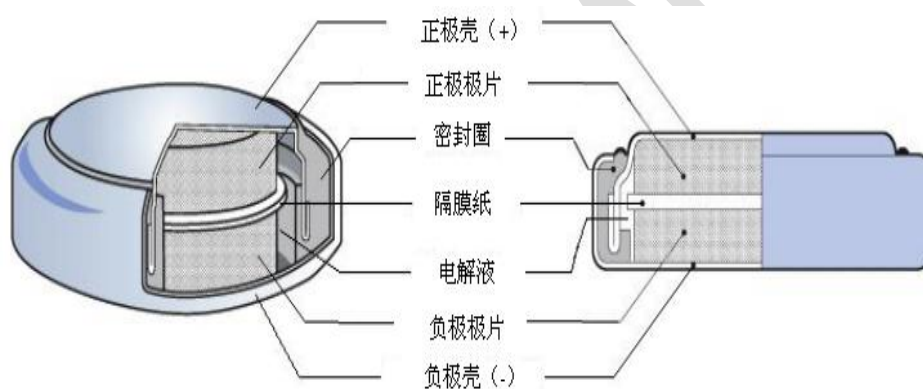
(Test basis)

QC/T 741-2014 Vehicle super capacitor

Kamcap supercapacitor product specification

DL/T 1652-2016 Technical specifications for supercapacitors for electric energy metering equipment

This product is based on the principle of electric double layer capacitors, using activated carbon as positive and negative electrodes inside, separated by electrolyte and diaphragm between the two electrodes, stainless steel shell.



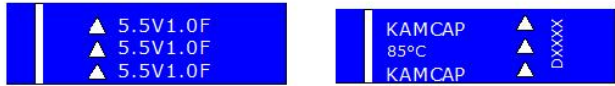
Kamcap supercapacitor product specification

Rated Voltage (25 °C) U_0	5.5V		/
Category Temperature Range	-25 ~ 85		/
Storage temperature range (at 0V)	-25 ~ 85		/
Rated Capacitance (25 °C)	1F		V 4.4V-2.75V
Permitting Capacitance Error	-10% ~ + 30%		/
Internal Resistance	AC@ 1kHz	25	/
Nominal Current (25 °C)	0.050A		Charge to rated voltage U_0 5s discharge to 1/2 U_0
Max Current (25 °C)	0.054A		Charge to rated voltage U_0 1s discharge to 1/2 U_0
Leakage Current at 72h (25 °C)	12 μ A		/

Kamcap supercapacitor product specification

Item		Specification/Condition
01	Low Temperature	Placed in an environment of -25 for 2 hours, there is no damage to the appearance, no leakage, and the capacity change rate does not exceed $\pm 30\%$
	High temperature	Placed in a +85 environment, working for 16 hours, no damage to the appearance, no leakage, and the capacity change rate does not exceed $\pm 30\%$
02	High temperature load	+85 plus 5.0V voltage, after 1000h, C/C 30%, ESR 4 times the specified value.
03	High temperature storage	ESR 2 times the initial value (25) at +85, 96h, after 2h standing at room temperature, the appearance is not damaged, no leakage, C/C 10%, ESR 2 times the initial value (25)
	LOW temperature storage	-25, 96h, after 2h standing at room temperature, the appearance is not damaged, no leakage, C/C 10%, ESR 2 times the initial value (25)
04	The steady state damp heat test	+40, 90-95RH, 240h, C/C 30%, ESR 4 times the specified value.
05	Cycle life Expectancy	With rated voltage, 500,000 cycles of charging and discharging experiments at room temperature. C/C 30%, ESR 4 times the initial value (25)

Kamcap supercapacitor product specification

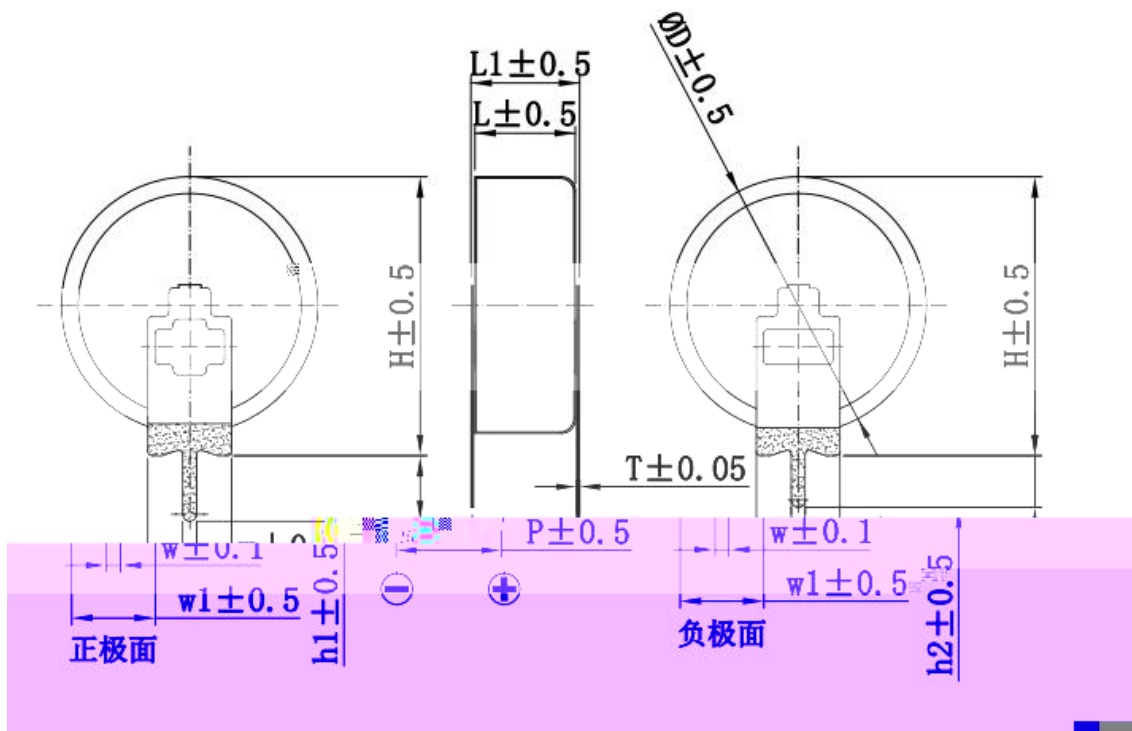


① Cathode sign

②

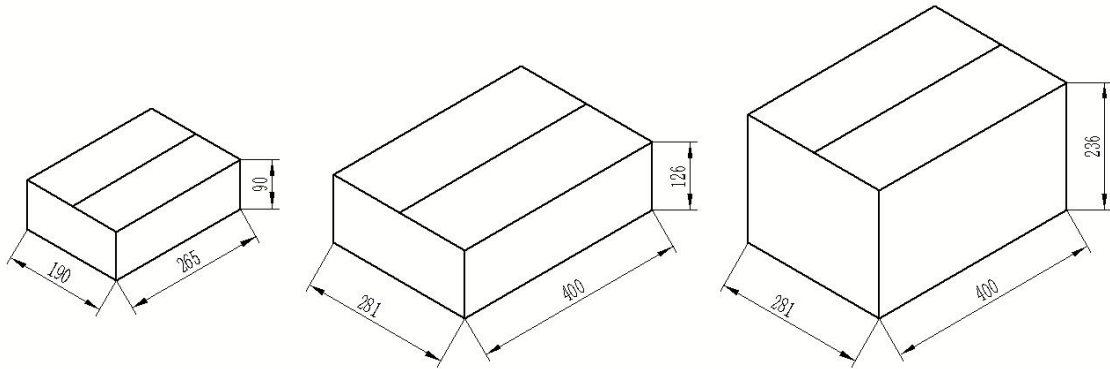
③ KAM Brand

Rated capacitance and rated voltage



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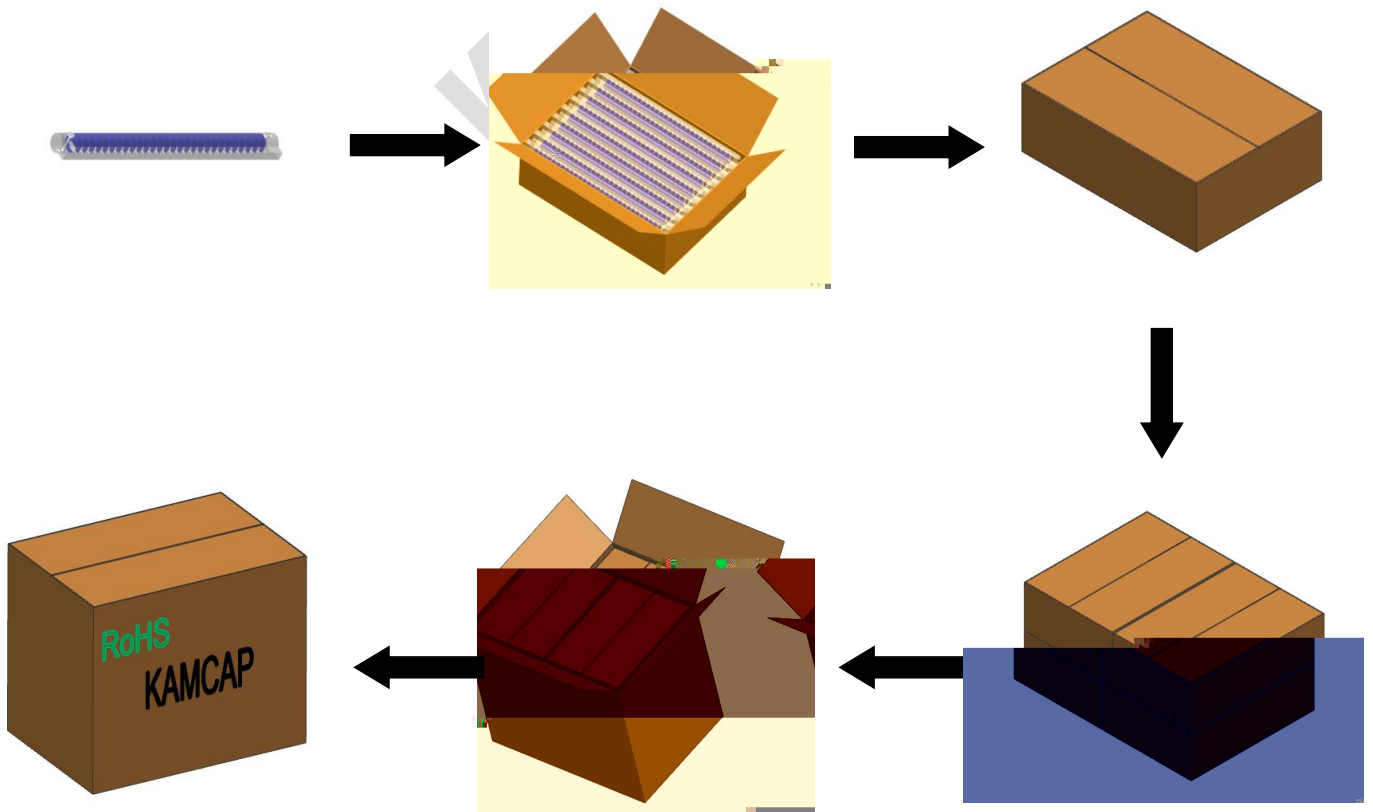
Size of inner packing	Size of outer packing
265×190×90	400×281×126



inner packing

outer packing

Packing Schematic



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According to the standard

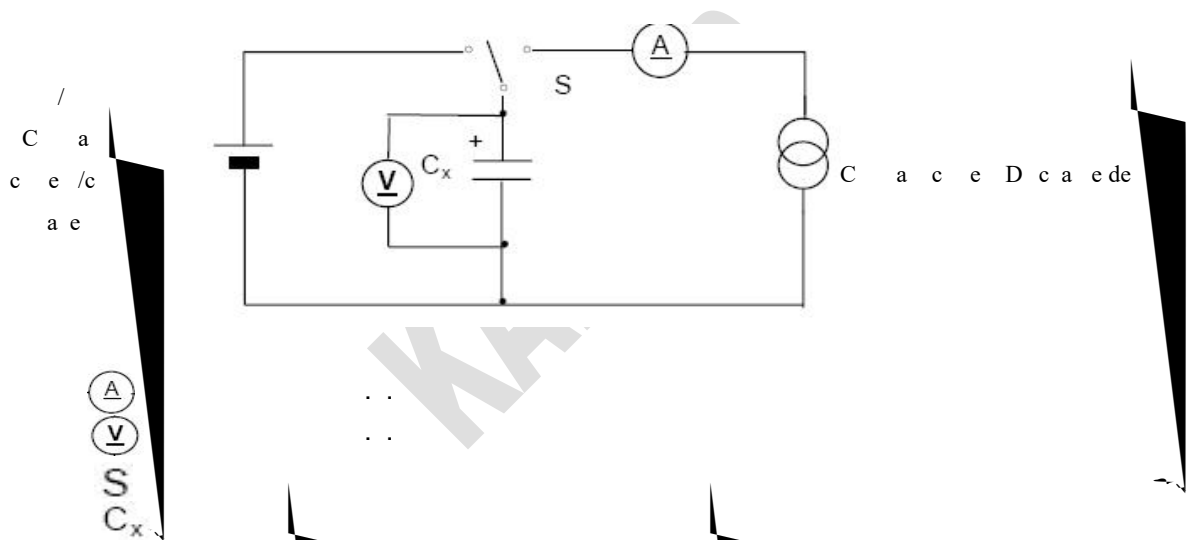
QC/T 741-2014 Vehicle super capacitor

Q/GDW 11845—2018 Technical specifications for supercapacitors for electric energy metering equipment

DL/T 1652-2016 Technical specifications for supercapacitors for electric energy metering equipment

capacity test

Measuring circuit



measuring method

Setting the direct current voltage of constant current/constant voltage power supply as rated voltage (UR)

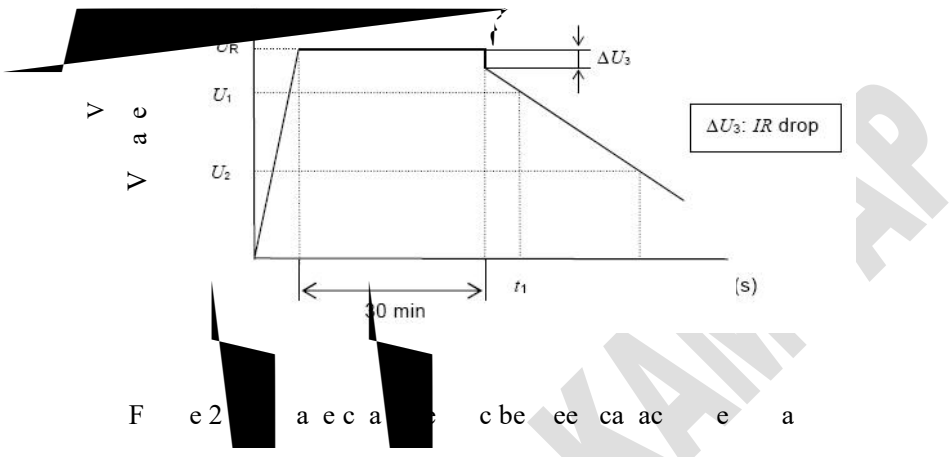
Setting the constant current value of the constant current discharge device , according to Table 2 specified.

Kamcap supercapacitor product specification

Turn the switch S to the d.c. power supply, and unless otherwise specified in the individual standards, apply voltage and charge for 30 min after the constant current/ constant voltage power supply has achieved the rated voltage.

After charging for 30 min has finished, change over the switch S to the constant current discharge device , and discharge with a constant current.

Unless otherwise specified in the individual standards, measure the time t1 and t2 where the voltage between capacitor terminals at the time of discharge reduces from U1 to U2 as shown in Figure 2, and calculate the capacitance value by the following formula:



$$C = \frac{I \times (t_2 - t_1)}{U_1 - U_2}$$

- C capacitance (F)
- I discharge current (A)
- t1 measurement starting voltage (V)
- t2 measurement end voltage (V)
- t1 the time from discharge start to reach U1 (s)
- t2 the time from discharge start to reach U2 (s)

Discharge current I and decrease in voltage of discharge voltage U1, U2 , according to table 1

Kamcap supercapacitor product specification

Table 1 – Discharge conditions

Classification	Coin type product)		
Application	Energy storage	Instantaneous power, power	$I_1 = \frac{C_R \times U_R}{3600}$
Charging time	30min	30min	
I A	$I = 5I_1$	$I = 40I_1$	
U1	80% of the charging voltage 0.8×UR		
U2	50% of the charging voltage 0.5×UR		
<p>Remarks</p> <p style="text-align: center;">F ;</p> <p>C_R is the nominal capacity of the supercapacitor in Farads (F);</p> <p style="text-align: center;">V ;</p> <p>U_R rated voltage in volts (V);</p> <p style="text-align: center;">A ;</p> <p>I is the charge and discharge test current in amps (A);</p> <p>I_1 is a supercapacitor 1 times charge and discharge current in amps (A)</p>			

Equipmen

- A ARBIN super capacitor test system
 - B Linear DC stabilized voltage power supply
 - C Constant current discharging device
 - D Voltage recording device
- AC internal resistance test
- Measuring circuit
- As shown in the measurement circuit for testing

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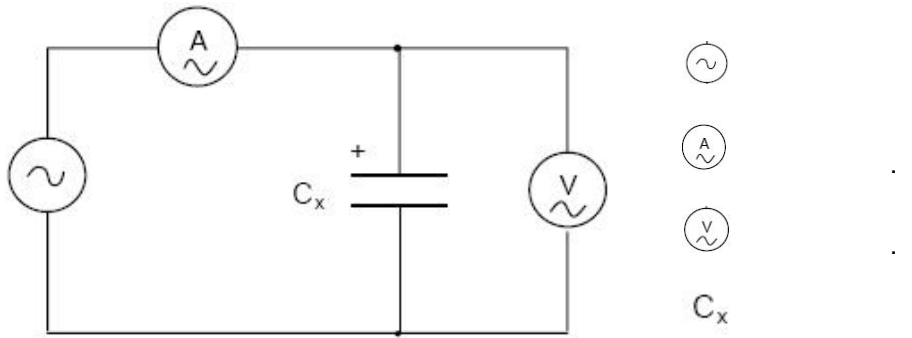


Figure 3–Circuit for a.c. resistance method

Measuring method

The internal resistance R_a of a capacitor shall be calculated by the following formula:

$$R_a = \frac{U}{I}$$

where

R_a a.c. internal resistance

U the effective value of a.c. voltage V r.m.s

I the effective value of a.c. current V r.m.s

The frequency of the measuring voltage shall be 1 kHz

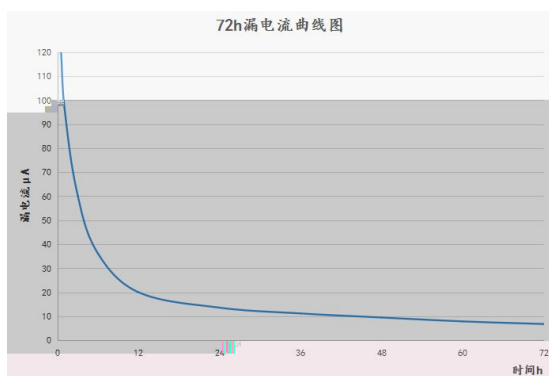
The a.c. current shall be from 1 mA to 10 mA

equipment

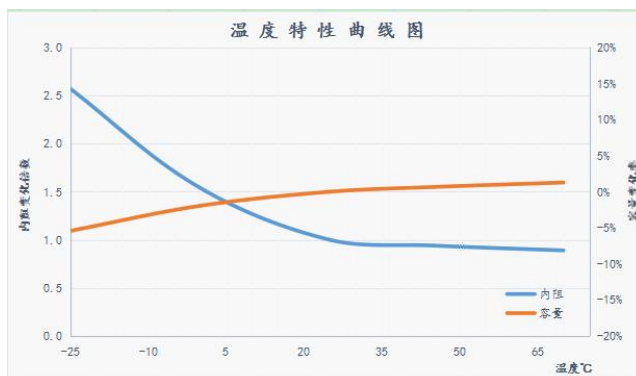
Internal resistance tester

Kamcap supercapacitor product specification

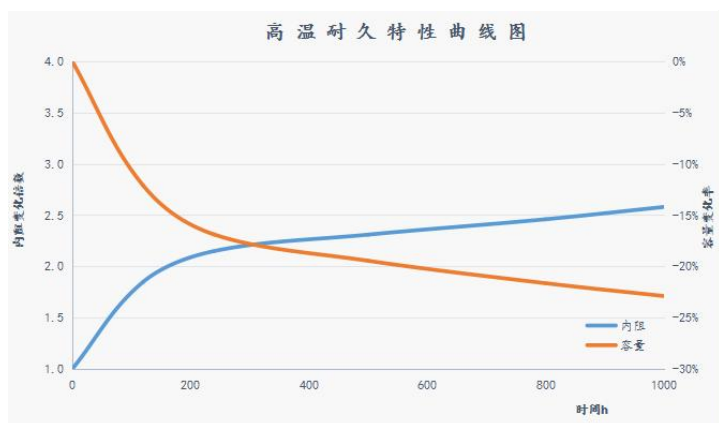
Leakage curve



temperature characteristics



High temperature durability characteristic curve



The above curves are all trend curves, and the data of different models are different. If you have any requirements, please contact the technology.

Supercapacitors cannot be used in the following states

- a) temperature above the nominal temperature

When the temperature of the capacitor exceeds the nominal temperature, it will cause the electrolyte to decompose, and the capacitor will heat up and the capacity will drop. Moreover,

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Internal resistance R_{int}

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Do not forcibly twist or tilt the capacitor after installation.

When the supercapacitors are used in series, there is a voltage balance problem between the cells.

Do not store in a place with a relative humidity greater than 85% or containing toxic gases and in a high temperature, high humidity environment. It is recommended to store in an environment with a temperature of -30 ~ 50 and a relative humidity of less than 60% for a long time.

Avoid preserving supercapacitors in the following environments

Environment where direct splashing water, salt water and oil are present, or in a dew condensation state, filled with gaseous oil or salt.

An environment filled with harmful gases (hydrogen sulfide, sulfuric acid, chlorine, ammonia, bromine, methyl bromide, etc.).

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